REMARKS

Reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1-4 and 6-26 remain pending in the application. Claim 5 is cancelled.

Applicant's undersigned attorney wishes to thank Examiners Brier and Amini for the courtesies extended during the personal interview conducted on February 1, 2005.

Claims 1-4 and 6-26 are rejected under 35 USC 103(a) as being unpatentable over McGreggor et al. and Tsukada and further in view of Holub. In response, independent claims 1, 11 and 12 have been amended and are believed to be patentable over this combination of references for the reasons discussed below.

The present invention can make it possible to provide an information of colorant recipe for a target color utilizing visual perception of a user, without the need of a spectrophotometer. Such advantage or problem is not and cannot be present in McGreggor et al. because McGreggor et al. is not a system of presenting colorant recipe to a user.

In the field of the above CCM information system, it has been needed to measure tristimulus data of an actually produced color chip mixture with a spectrophotometer and data of the tristimulus values of the actually produced test mixture with a spectrophotometer.

The CCM system of the invention is an information system for presenting an information to a user of a blending ratio of colorants (recipe) for reproducing a target color through the Internet or the like. In short, the CCM system described in the present invention is an information system of colorant recipe. The user will know the recipe of colorants usable for reproducing a target color by mixing colorants. The mixing step is a different step performed after the method of the present invention is completed. The user may know the recipe and may not reproduce the target color.

A user (client) inputs data of a color chip whose color is similar to a target color. A color chip is a color sample (physical object) such as that selected from a "Standard Color Atlas for Paints." The user has such color atlas including many color sample boards (chips) on his desk; for example, if a user wants to know an appropriate blending ratio of colorants for reproducing a particular target color.

The target color is also a physical image typically printed on a board. It is necessary to specify a particular combination of colorants selected among a tremendous number of known colorants. The CCM system of the present invention is an invention system for presenting such combination of colorants to a user.

In the present invention, the user visually compares the color chips and the target color (board or the like) on his desk (not on an image displayed on a screen at this stage). The user then visually selects color chip whose color is similar to a desired target color on his desk or the other places (not on display). The user then inputs a reference number of the selected color chip by means of the data input device 5 (step 24).

The user visually compares the selected color chip and the target color board (both physical objects) on his desk. The user inputs data differences between color specification values corresponding to a color chip and color specification values corresponding to a target color. There may be small differences of hue, chroma and lightness. The user then specifies the differences of hue, chroma and lightness in the image based on the visual evaluation of the differences of hue, chroma and lightness between the selected color chip and the target color board or the like on his desk. For example, an image is displayed on the screen for specifying the differences of color specification values with respect to the color specification values of the selected color chip (step 26). The user then input the differences on the screen. Such selection may be carried out by clicks of a mouse on the table shown on the screen.

Figure 5 shows one example of the image for specifying the differences of color specification values. In Figure 5, the selected color chip is displayed in a column "Before Specification." The differences (as numerical values) of hue, lightness, chroma and color are arranged in the upper half of Figure 5 to form scales thereof. Each of the scales is vertically elongated. A number of color portions (boxes) are arranged in the order of each difference of hue, chroma or lightness in spaces of "Portions for Specification." In each of arrays for hue, chroma and lightness, color boxes are arranged in the descending or ascending order of hue, lightness or chroma.

At this stage, the user visually compares the selected color chip and the target color board, and evaluates the differences of hue ΔH^*, lightness ΔL^* and chroma ΔC^*, of the color chip and the target color board on his desk. The user clicks a desired point with a mouse pointer on each scale for specifying each of the differences of hue ΔH^*, lightness ΔL^* and chroma ΔC^*, based

on the evaluation of the differences of the physical objects (color chip and target color board).

In another method, the user clicks one of the colors displayed in "Portions for Specification" boxes. When the user clicks one color box among the color boxes arranged in an array, the hue, chroma and lightness of the clicked color box are automatically selected and recorded.

In the present invention, the calculation of a blending ratio of colorants for reproducing the target color based on the stored color data and the differences of the color specification values is based on the stored color data which includes data of color chips and data of colorants. Data of blending ratio of colorants for color chips are not stored.

In the case of an object for printing, the equation of Kubelka-Munk (1) is applied. In the case of a plastic (opaque) and an object for a paint, the Duncan's equation (5) is applied. In the case of a plastic (transparent), the theoretical equation (7) of Lambert-Beer is applied. Data of each colorant is used for performing such calculation. The calculation blending ratio is displayed and presented to the user.

One example of a list of the thus calculated blending ratios of colorants is shown in Figure 6. In Figure 6, each of the numbers 1 and 8 show each blending ratio of colorants. A colorant 1 is white, a colorant 2 is black and colorants 3 and 4 are chromatic colors. Further, ΔE indicates color differences. The user utilizes the information of the blending ratio of colorants displayed and actually formulates and mixes the colorants on the user's side.

By contrast, in <u>McGreggor et al.</u>, the method is for processing color information. First, a source color with a specific data structure is specified. The data structure includes a source color space and data packaging format and source color data. A destination is then specified in another destination data structure (another space and format). The source color data and destination color data are computed (col. 2, lines 1-14). Preferably, the source color data is converted into a working color space (col. 2, lines 15-24).

By providing the capability to manipulate color information having an arbitrary source color space in a known working space, a user can become familiar with a working color space and utilize that working color space to perform operations on a given color with results that are easily understandable to the user. After performing the operation, the data is reconverted into the destination color space (col. 2, lines 26-33). In Figure 1, source color stores 13 and 17 are structured as a data structure such as a bit map frame (col. 5, lines 9-17). Column 14, line 4 to column 15, line 18, describes transfer mode. The transfer mode specifies how the color is drawn to

replace the background color. For example, according to blend mode, the destination component is replaced by the average of the source component and destination component using the migrateMode.

Color matching is roughly described in column 11, lines 5-14. A color is matched when translated from one color space to another. The color may be matched using colorimetrics or perceptually, so that the color appears to the eye to best match the desired color. This is a kind of color data conversion process between different color spaces applied in different devices for presenting colors matching the eyes.

Color matching is generally described in column 18, line 40 to column 19, line 43. As shown in Figures 15 and 16, a translator 1515 receives a signal defining the original color from a source device. The definition takes the form of colorant amounts in the color space of the source device. The color translator 1515 then corrects the original color amounts for source device anomalies in response to the total reproduction curves (TRC) in the profile store 1522. After the correction, the translator 1515 converts the color to tristimulus values (1632). In response to the independent profiles of the source and destination devices, the translator then calculates the quantities of colorants needed in the destination device to reproduce the color of the source device (1633). Next, an inverse tonal reproduction curve is accessed to correct the calculated quantities for destination device anomalies (1634). Finally, the corrected quantities are applied to the destination device to reproduce the color (1635).

Figures 18 and 19 provide typical TRC curves. The TRC's are measured tables with a finite number of samples. Interpolation is used to complete the range of the TRC during use (col. 20, lines 6-12). TRC is used to correct the original color amounts for source device anomalies. Figures 22-35 illustrate a specific and detailed example of the color translator and profile store 1522 of Figure 15 (col. 21, line 40 to col. 33, line 26).

Tsukuda discloses a color conversion method for converting an original color represented by a combination of three primary colors RGB into a converted color represented by four colors CMYK to reproduce the original color by the use of the four color inks (col. 1, lines 6-17). The color conversion method is used in carrying out color reproduction between a display and printer (col. 1, lines 15-17).

Turning to Figures 10 and 11, a color conversion apparatus 200 is supplied with a first color reproduction zone table 20 for a display and a second color reproduction zone table 21 for printing

device using CMYK ink. The color reproduction table describes color reproduction zones (color gamuts) of the display or printer. The printer color reproduction zone table is obtained by measuring a plurality of color chips printed under control of the amounts of CMYK ink (col. 7, lines 23-42). Color signal converter 6 is synthesized based on the display and printer color reproduction zone tables 20 and 21. Input color signal 103 is converted using the color signal converter 6 to generate CMYK ink amount 104 (col. 10, lines 32-46 and Figure 10).

Traditionally, data consists of three components which indicate the value of energy for the red, green and blue electron guns on a color monitor. The actual colors generated in response to a given value stored in a computer vary from monitor to monitor (col. 1, lines 25-30). McGreggor et al. provides a system for converting a processing a source color data in conformity with various kinds of color spaces for driving various kinds of devices (such as color display and printer) so that the source color can be presented to the eyes with a high fidelity reflecting the characteristics of the devices. McGreggor et al. is not related to an information system for presenting information of the blending ratio of colorants for reproducing a target color to a user for manufacturing the target color in the user's side. According to the present invention, the differences between color specification values are specified by a user on an image in a display, based on visual perception of the color chip and target color. Such specification values displayed on an image on a screen are not described in McGreggor et al.

Returning to claim 1, there are differences between claim 1 and McGreggor et al. McGreggor et al. is directed to enable the conversion of colors defined in a first color space to colors defined in a printer color space. In short, McGreggor et al. is directed to a system for color matching between different printers or the like.

According to the present invention, data identifying a color chip is received. Then data of user-specified differences between color specification values corresponding to the color chip and color specification values corresponding to a target color is received. The differences between color specification values are specified by a user based on visual perception of the color chip and target color.

According to McGreggor et al., as shown in Figures 15 and 16, a translator 1515 receives a signal defining the original color from a source device. The definition takes the form of colorant amounts in the color space of the source device. The source data is defined in a specific data structure.

According to the present invention, a user selects a specific color chip similar to the target color by visual perception. The color chips are physical entities.

The origin of the source data is not described and defined in McGreggor et al. because the purpose of McGreggor et al. is to reproduce the source color in another destination device in high fidelity. The origin of the source color data cannot be limited to the color chips used in the present invention because the purpose of McGreggor et al. is to reproduce the source color in the destination device. The source color data is target color in the source device and converted to suitable format for the reproduction in the destination device. McGreggor et al. discloses a correction (conversion) processing of the source data (target color) required to reproduce the corrected target color in the destination device. Color information is input in McGreggor et al. The color information is that of the source color (target color) to be reproduced. There is no description and room for inputting data of the selected color chips for reference with respect to the target color, in addition to the target color.

According to Tsukuda, color reproduction zone tables 20 and 21 are kinds of networks including data of many color chips, each data including ink composition. The color signal converter 6 is synthesized from the tables 20 and 21 for processing input color signal. The color reproduction tables are used to synthesize the color converter 6 for processing the input color signal in Tsukuda. The color reproduction table is a database of data of color chips and corresponding ink compositions.

According to the present invention, the data of color chips and colorants are stored in a server in advance. In addition to this, signal of the identification of the selected particular color chip is input into the server. The selected color chip is used as the reference of visual perception of the target color. Such input of the particular color chip is not described in Tsukuda.

According to the outstanding Office Action (page 2, line 20 through page 3, line 6), Figure 23, Item 23120, teaches a colorimetric device which would specify differences between color specification values corresponding to the source color (color chip) and those corresponding to a destination color (desired color). However, according to McGreggor et al., the translator 1515 converts the source color to tristimulus values (1632). In response to the independent profiles of the source and destination devices, the translator then calculates the quantities of colorants needed in the destination device to reproduce the source color of the source device (1633). Figures 22 through 35 illustrate a specific and detailed example of the color translator and profile store 1522 of Figure 15

(col. 21, line 40 to col. 33, line 26). As shown in Figure 23, the inputs to the initialize routine include independently derived color profiles of color graphic devices. The inputs may include flags used to select selectable features of the translator system (23120). The flags include a perceptual/colorimetric flag and a natural/synthetic flag. The flags are used to select options for handling the differences between the source and destination gamuts (col. 21, lines 57-67). Gamuts are color reproduction zones characterized of the display or printer.

As described above, the translator 1515 converts the source color to tristimulus values (1632). In response to the independent color profiles of the source and destination devices, the translator then calculates the quantities of colorants needed in the destination device to reproduce the color of the source device (1633). In such calculation, the flags are used to select the options required for handling of the differences of gamuts (color reproduction zone tables).

According to the present invention, the user-specified differences between color specification values corresponding to the color chip and color specification values corresponding to a desired target color is input. The difference is specified by a user based on visual perception of the color chip and desired target color, as described above.

In McGreggor et al., the source color data (target color data) is input and translated by the translator in conformity with the gamuts of the destination device using the flags to select the options required for handling of the differences of gamuts. There is no disclosure of the specification of the differences of the color specification values of the color chip and target color based on the visual perception of both by a user.

According to the outstanding Office Action (page 3, lines 6-13), McGreggor et al. provides typical TRC curves. The profile of Figure 18 includes a TRC for each primary colorant for a typical CRT monitor. The profile of Figure 19 represents a TRC for typical printer ink. The TRC are measured tables with a finite number of samples. Interpolation is used to complete the TRC during use (col. 20, lines 5-12 and Figures 18 and 19 of McGreggor et al. As shown in Figures 15 and 16, a translator 1515 receives a signal defining the original color from a source device. The definition takes the form of colorant amounts in the color space of the source device. The color translator 1515 then corrects the original color amounts for source device anomalies in response to the TRC in the profile store 1522. After the correction, the translator 1515 converts the color to tristimulus values (1632). In response to the independent profiles of the source and destination devices, the translator then calculates the quantities of colorants needed in the destination device to reproduce

the color of the source device (1633). According to McGreggor et al., the colorant amounts of the source color in the color space of the destination device is calculated, based on the colorant amounts in the color space of the source device and independent profiles (TRCs) of the source and destination devices. The source color (target color for reproduction) data is processed using TRCs to obtain target color data in conformity with the profile of the destination device.

By contrast, according to the present invention, a blending ratio of colorants for reproducing the target color is calculated, based on the stored color data (data of color chips and colorants) and data of the user-specified differences of the color specification values.

According to McGreggor et al., interpolation is used to complete the TRC during use. This interpolation is used to complete all the necessary items of the TRC table not filled with the data of finite number of samples. The calculation is the interpolation of colors and the corresponding colorant compositions for reproduction based on the data of finite number of color samples and the corresponding colorant compositions. Such interpolation method is a mathematical calculation automatically performed by a computer according to a specific equation and measured data of color samples using a specific printer. There is no way to display an image for a user to specify differences between color specification values corresponding to a color chip and color specification values corresponding to a target color.

According to the present invention, a mathematical calculation is performed after the user specifies the differences between color specification values corresponding to a color chip and color specification values corresponding to a target color.

Apart from the above discussions, Applicants believe the present invention is not the manual version of McGreggor et al. as summarized below. According to McGreggor et al., a translator 1515 receives a signal defining the original color from a source device. The source color data is target color in the source device and is converted to suitable format for the reproduction in the destination device.

McGreggor et al. discloses a correction (conversion) processing of the source data (target color) required to reproduce the corrected target color in the destination device. According to the present invention, data identifying a color chip is received. A target color data is not directly supplied.

According to McGreggor et al., the colorant amounts of the source color in the color space of the destination device is calculated based on t he colorant amounts in the color space of the

source device and independent profiles (TRCs) of the source and destination devices. According to McGreggor et al., interpolation is used to complete the TRC during use. The calculation is the interpolation of colors and the corresponding colorant compositions for reproduction based on the data of finite number of color samples and the corresponding colorant compositions. Such interpolation method is a mathematical calculation automatically performed by a computer according to a specific equation and measured data of color samples using a specific printer.

According to the present invention, a blending ratio of colorants for reproducing the target color is calculated based on the stored color data (data of color chips and colorants) and data of the user-specified differences of the color specification values. According to the present invention, a mathematical calculation is performed after the user specifies the differences between color specification values corresponding to a color chip and color specification values corresponding to a target color.

Holub does not overcome the deficiencies discussed above with respect to McGreggor et al. and Tsukada. Accordingly, for the reasons discussed above, the obviousness rejection should be withdrawn.

All objections and rejections having been addressed, it is respectfully submitted that the present application should be in condition for allowance and a Notice to that effect is earnestly solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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